

CLAIMS

1. An instrument having a user controllable operating parameter and at least one further operating parameter having a required value at least partially dependent on that of said user controllable parameter, the instrument also having a memory for storing a number of possible values of the further operating parameter, each said value corresponding to a respective possible value of the user controllable parameter, a selector for selecting one of said stored possible values for the further parameter and controlling the instrument accordingly, a tuner for enabling a user to alter the selected value, and updating apparatus for updating the memory accordingly, so that the adjusted value of the further operating parameter is selected from the memory if the same value of user controllable parameter is then chosen again.
2. An instrument according to claim 1 in which the instrument is operable to enable the user to select an intermediate value of the user controllable operating parameter between two of the values for which there are corresponding entries in the memory for the further parameter values, the selection means being operable to interpolate the values of the further parameters given at those entries to select a value of the further parameter corresponding to said intermediate value of the controllable parameter.
3. An instrument according to claim 2, in which the updating apparatus is such that if the selected, interpolated further parameter value is adjusted, the updating apparatus is operable to update each of said two values in the memory means so that said interpolation would have yielded the adjusted value in response to the selection of the same intermediate value of user controllable parameter had this occurred after said updating.

4. An instrument according to claim 3, in which if the selected, interpolated further parameter is updated, only said two values in the memory mean are updated.
5. An instrument according to claim 1, in which the stored values of the further parameter are arranged in the memory in an index in which the stored values are arranged in an order corresponding to progressively changing values of the associated user controlled parameter.
6. An instrument according to claim 1, in which the further operating parameter is one of the plurality of such parameters, values for all of which are stored in the memory means.
7. An instrument according to claim 1, in which the instrument is a charged particle beam instrument having beam generating means for generating charged particles and for subjecting said particles to an accelerating voltage to create a beam, and an alignment element for controlling the alignment of the beam, wherein said accelerating voltage constitutes the user controllable parameter and the further operating parameter comprises a setting for the alignment element.
8. An instrument according to claim 7, in which the alignment element is a magnetic coil, and the associated further parameter is the value or relative value of current passed through the coil.
9. An instrument according to claim 7, in which the alignment element is an electrode the value of the associated parameter being the voltage applied to the electrode.
10. An instrument according to any of claim 7, when appended to claim 6 in which the instrument has a plurality of different alignment coils, and the further operating parameters comprise the currents in the coils or the relative current magnitudes in the coils.

11. An instrument according to claim 7, in which the charged particle beam instrument is a scanning electron microscope, the beam generating means, comprising an electron gun having a cathode and an extraction electrode to which said accelerating voltage is applied, the alignment coils acting as gun alignment coils for controlling the alignment of the beam onto an electron optical axis of the microscope.
12. An instrument according to claim 11, in which the electron microscope includes a plurality of apertures in the path of a beam to be generated by the beam generating means, wherein the alignment coils are operable to direct the beam through any selected one of the apertures.
13. An instrument according to claim 12, in which the magnitude of the accelerating voltage comprises one of a plurality of user controllable parameters, another such parameter being constituted by the identity of the aperture through which the beam is to pass.
14. An instrument according to claim 13, in which the stored values are arranged in a list in which each said value is identified by a respective index code representative of the combination of accelerating voltage and aperture identity for which the stored value of alignment coil current or relative current at that entry applies.
15. An instrument according to claim 14, in which the list is part of a look-up table, for each index code, there are also stored values for additional parameters applicable to the respective combination of aperture identity in accelerating voltage.
16. An instrument according to claim 15, in which the instrument includes stigmator coils for correcting the distortion of the electron beam, the current for each such coil constituting a respective additional further parameter.
17. An instrument according to any of claim 11, in which the instrument has a number of operating modes, each of which constitutes a user controllable parameter, the

index code also being representative of the state of at least one the operating modes.

18. A scanning charged particle beam instrument having a gun for generating the beam of charged particles, a plurality of apertures through any selected one of which the beam may pass, accelerating electrode means which a voltage is applied to accelerate the particles away from the gun, and alignment means for directing the beam through the selected aperture, wherein the instrument includes a memory in which are stored values for the settings of alignment means dependent on the voltage applied to the accelerating electrode and the choice of aperture.